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Comparison between 3DCRT and IMRT in the treatment of the breast and IM/MSL lymph nodes

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We selected 6 consecutive breast cancer patients (3 right side, 3 left side) treated with conservative surgery, depending on the risk factors we decided for post-operative RT on the breast and the ipsilateral internal mammary chain and medial supraclavicular lymph nodes (IM/MSL). The RT treatment was studied with a conventional 3D conformal technique and was compared with an IMRT one. The treatment planning system is RTPS Eclipse-Varian. For all the patients we used a personalized vacuum; we acquired CT slices every 5 mm; CTV, PTV and OAR were delineated on all the CT slices.

The conventional treatment consists of 4-5 photon fields, 2 isocenters, wedges and personalized shields (static MLC with 120 layers).

The IMRT treatment consists of 4 fields, one isocenter and a sliding window technique.

For every patient we evaluated and compared the DVH of the PTV and the OAR (heart, ipsilateral lung, contralateral breast and spine) and we considered the Conformity Index (CI) as the quantitative parameter for evaluating the differences between the 2 treatments.

The CI of the PTV was better in the IMRT treatment with an improving of 18.5% in comparison to the conformal RT and with a significant tendency to 1. Moreover we registered a better homogeneity in the PTV dose distribution and a reduction in the maximal dose to OAR, in spite of an increasing dose to the whole body and the spine in the IMRT treatment.

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Radiotherapy for screen-detected DCIS: Indications and utilization in the UK: findings from the Sloane project

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Introduction: The Sloane project is a UK-wide audit of the management of screen-detected Ductal Carcinoma *In Situ* (DCIS). There is an increasing use of wide local excision (WLE) in preference to mastectomy as definitive surgical therapy. Over the last decade a number of randomised control trials (RCTs) have confirmed that post-operative whole-breast irradiation (RT) following wide local excision (WLE) of DCIS reduces the risk of *in situ* and invasive recurrence. Available RCTs do not readily allow the identification of patients who benefit most, or conversely, do not require RT and a number of factors which predict the risk of local recurrence have been used either alone or in combination to select patients to receive RT. RT resources within the UK are limited and the increasing use of RT for DCIS places an additional strain on overstretched RT services, worsening existing waiting lists.

Description: The study group consisted of 870 patients who underwent WLE for DCIS. 453 patients were referred for RT. Treatment and pathology data were available for 655 patients. RT use following WLE was correlated with the pathological characteristics of the tumour and with margin status.

Summary of results: Of 70 cases where margins were recorded as being <1 mm, 34 cases (48.57%) received RT. Corresponding figures for 152/263 cases with 1 to 9 mm margins and 129/229 cases with ≥10 mm margins were 57.79% and 56.33% respectively ($p > 0.05$). Tumour size varied from 0.5 mm to 152 mm. RT use varied with tumour size: ≤15 mm – 161/374 (43.05%); 16 to 40 mm – 153/211 (72.51%); ≥41 mm – 14/19 (73.68%) ($p < 0.00001$). RT use also varied with DCIS nuclear grade: high grade – 243/338 (71.89%), intermediate grade – 63/209 (39.71%), low grade – 12/69 (17.39%) ($p < 0.00001$) and with tumour necrosis: presence of necrosis – 272/406 (67.00%); absence of necrosis – 63/215 (29.30%) ($p < 0.00001$). For Van Nuys Score (VNS) 3-4, 33/122 (27.05%) received RT, for VNS 5-7, 252/381 (66.14%) received RT and for VNS 8-9, 17/21 (80.95%) received RT ($p < 0.00001$).

Conclusion: The use of RT for DCIS cases treated with WLE varied with tumour size, nuclear grade and the presence of necrosis but not with margin size. There was a good correlation with Van Nuys Score, suggesting the use of this scoring system in routine practice.

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Locoregional relapses after postoperative radiotherapy in 2809 breast cancer patients treated from 1988 to 2003

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We examined the data of 2809 breast cancer patients (pts) treated in our institution with postoperative radiotherapy (RT) after conservative surgery or mastectomy, between 1988 and 2003.

We focused our analysis on the rates of local, regional and distant relapses.

The main characteristics of the patients according with the fifth edition of TNM, are the following ones: the median age was 56.64 years (27-90); the pT stage was pTis in 3.6%, pT1 in 64%, pT2 in 24.5%, pT3 in 1.7%, pT4 in 4.8% and pTx in 1.3%; the pN stage is pN0 in 62.8%, pN1 in 35.2%, pN2 in 1.4% and pN3 in 0.7% (24.5% 1-3 positive lymph nodes and 12.4% ≥4); the ER status was positive in 68.7%, negative in 19.5% and unknown in 11.7%, the PR status was positive in 53.3%, negative in 25.3% and unknown in 21.4%. Conservative treatment was the surgical procedure in 84.5% of the pts, while the remaining 15.5% were treated with radical mastectomy. The median interval between surgery and RT was 90.91 days (11-478). The total dose of RT, in case of conservative surgery, was 50 Gy to the whole breast + 10 Gy to the tumoral bed; 50 Gy to the chest wall in case of mastectomy; 50 Gy to the internal mammary chain (IM) and medial supraclavicular lymph nodes (MSC). 30.8% of the pts received RT on MSC while 19.3% on the IM. The 24.1% of the pts did not received adjuvant therapy, the remaining 32.9% received hormonal therapy while chemotherapy with different schedules was prescribed in the remaining 43%.

With a median follow-up of 5 years (15 days-17 years) the 5 and 10 years local relapse free survival (LRFS) is respectively 98% and 96%, the nodal relapse free survival (NRFS) is 99% and 98% and the metastasis free survival (MFS) is 91% and 79%.

We did not register a statistically significant difference in LRFS in the 2 groups irradiated or not on the IM chain, while there is a trend, even if not significant, between the 2 groups irradiated on MSC nodes. No significant difference in local relapse, depending on the interval between surgery and RT, was registered. The MFS was higher in the groups of pts treated with adjuvant hormonal therapy, CMF followed by hormonal therapy or no adjuvant therapy in comparison to the other subgroups treated with schedules containing antracyclin or taxanes. These preliminary results will be deeper analysed in specific subgroups.

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Relapse rates and patient outcome in breast cancer patients with 1-3 positive axillary lymph nodes. Is there an impact of axillary extracapsular tumor extension (ECE) on local and/or distant control?

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Purpose: There has been little information for lymph node positive breast cancer patients with extracapsular extension (ECE). This study examined the effect of ECE on locoregional relapse and survival in 1-3 nodes positive patients.

Methods and Materials: After a retrospective review of 1158 histopathologic records, information in 274 lymph node positive patients postoperatively irradiated was available: 91 (33.2%) patients presented with ECE and in 183 patients ECE was absent. Whereas all patients were irradiated using tangential fields, only 8 patients received nodal irradiation additionally.

Results: The mean patient age was 58.2 years. The mean observation period was 42.9 months. In 93.4% of patients locoregional control was achieved. In the multivariate analysis, ECE (Hazard Ratio: 2.71, $p = 0.007$) and histologic grade 3 (Hazard Ratio: 2.435, $p = 0.048$) remained as independent predictors of distant failure. The 3-year and 5-year metastases free survival rate for patients with ECE was 78% and 66%, compared to patients without ECE 90% and 87%, respectively ($p = 0.0048$).

Conclusion: Balancing the risks and benefits of irradiation, we conclude that locoregional recurrence remains low in breast cancer patients (1-3 positive axillary lymph nodes ± ECE) treated with surgery, an adequate axillary dissection, and tangential field irradiation only. However, ECE is significantly linked to an enhanced risk for subsequent distant failure.